User's Guide

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FMG210/220/230 SERIES
Low Flow Magnetic Flow Meter

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
WARNING: These products are not designed for use in, and should not be used for, human applications.

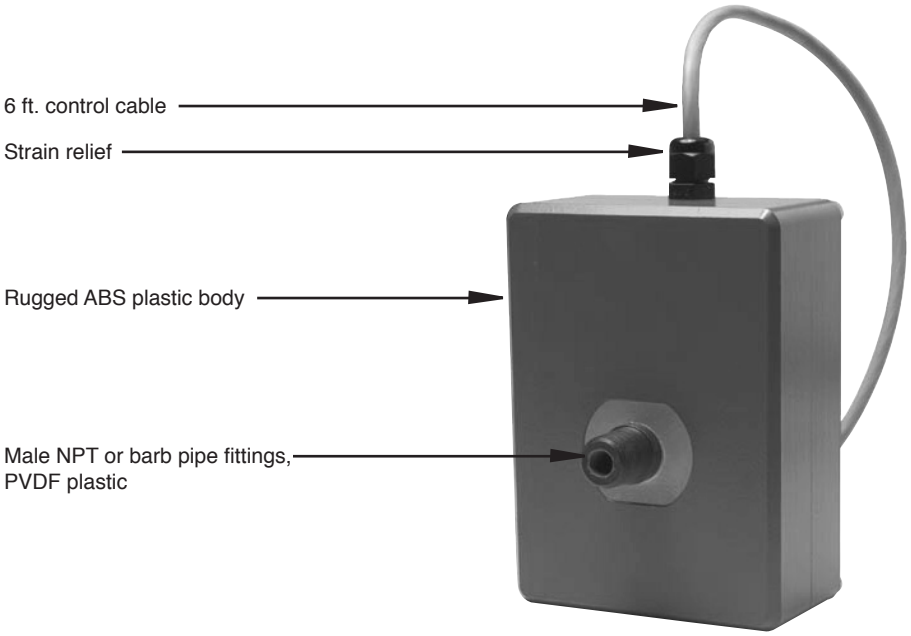
GENERAL INFORMATION

The FMG210/220/230 Series are small electromagnetic low-flow flowmeters with chemically-resistant plastic wetted parts and a choice of Hastelloy or platinum electrodes suitable for use with a variety of chemicals. Capable of measuring pulsating flows from diaphragm-type metering pumps, they are designed primarily for electrically-conductive chemical injection applications. The 1/4", 3/8", and 1/2" sizes monitor maximum flows of 1, 3, and 8 gallons per minute (or 4, 11, and 30 L/min), respectively. Barb or NPT fittings are available.

The FMG210/220/230 Series are 12-24 Vdc powered and come with standard pulse and analog outputs. All electronics are self-contained in a single compact chemically-resistant housing, well suited for OEM applications.

These meters are also appropriate for remote monitoring of chemical volume or rate using a computer or a PLC.

FEATURES



SPECIFICATIONS

Materials	**Body**	ABS plastic
	Electrodes	Platinum or Hastelloy
	O-Ring	Viton™ (EPDM optional)
	Fittings	PVDF plastic
Power		12-24 Vdc, 180 mA
Accuracy		+/-1% of reading, plus .005 gpm (0.02 lpm)
Max Fluid Temperature		185˚ F (85˚ C)
Maximum Pressure		150 psi (@ 75˚ F)
Minimum Conductivity		20 microSiemens
Outputs		• Frequency opto isolated 1000 pulse/liter (3785 p/g) • 4-20 mA opto isolated passive

FLOW RANGE

SIZE	LOW FLOW CUTOFF			MINIMUM FLOW for spec accuracy			MAXIMUM FLOW		
	L/MIN	GAL/MIN	GAL/HR	L/MIN	GAL/MIN	GAL/HR	L/MIN	GAL/MIN	GAL/HR
-025	.04	.01	.60	.26	.07	4.2	3.8	1	60
-038	.11	.03	1.80	.76	0.2	12	11	3	180
-050	.26	.07	4.20	1.9	0.5	30	30	8	480

INSTALLATION, CONNECTIONS, and OPERATION

INSTALLATION

Mounting. The FMG210/220/230 can be supported by its piping connections if the piping is rigid and there is no vibration. Alternatively, the grounding studs can be used for mounting by inserting them through pre-drilled holes. Note the centerline distance in the dimensional drawing on following page.

CAUTION: Although this meter has an empty pipe detection function, under certain conditions of empty or partially-full pipe the meter may read a flow when there is none. If this is a hazardous condition, mount the meter in such a way as to ensure the meter will always be full of liquid.

Piping. Metallic pipe or tube, or plastic tubing, can be used with the meter. The meter comes with male NPT or barb fittings (see chart, next page, for sizes).

For plastic tubing, use female NPT tubing adaptors. In installations exposed to vibration, it is not recommended to use the piping as the sole support for the meter, particularly on the smaller sizes.

A minimum of 1" of straight pipe run is recommended on the inlet side of the meter. Straight run is not necessary on the outlet.

CONNECTIONS

Power and signal connections are provided by the single 4- or 6-conductor color-coded cable. See the Wiring Connections chart on next page. In addition, it is necessary for proper operation to ground the unit to a good quality earth ground. Use the 12 ft. grounding wire supplied with the unit, or if necessary, a longer wire attached to one or both of the grounding studs. If metal piping is used, ground connections from the grounding studs on the bottom of the unit to both inlet and outlet pipes provide the best results in metering accuracy. See Grounding diagrams.

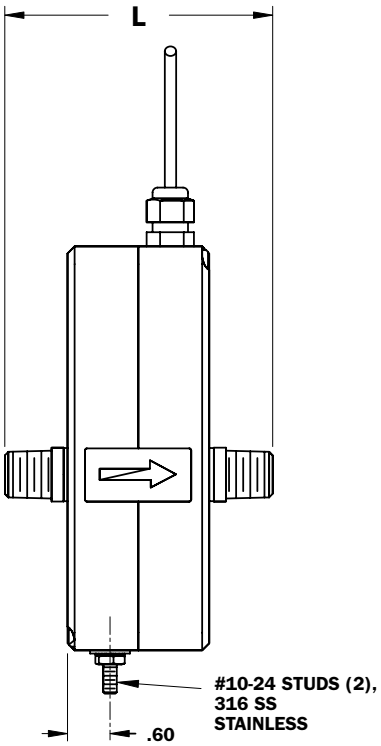
OPERATION

The newly-installed meter takes from a few seconds to a minute for the signal to stabilize at startup, especially if it has been dry. In normal operation, keep the meter filled with fluid to prevent this delay. An empty pipe detection feature will normally detect absence of liquid in the pipe and register zero flow when the meter is mounted properly.

The **4-20 mA signal** outputs 4 mA at zero flow and 20 mA at maximum rated flow. The **standard pulse signal** is a 50% duty cycle pulse set at 1000 pulses/liter (3785 pulses/gallon).

INSTALLATION, CONNECTIONS and GROUNDING

DIMENSIONS



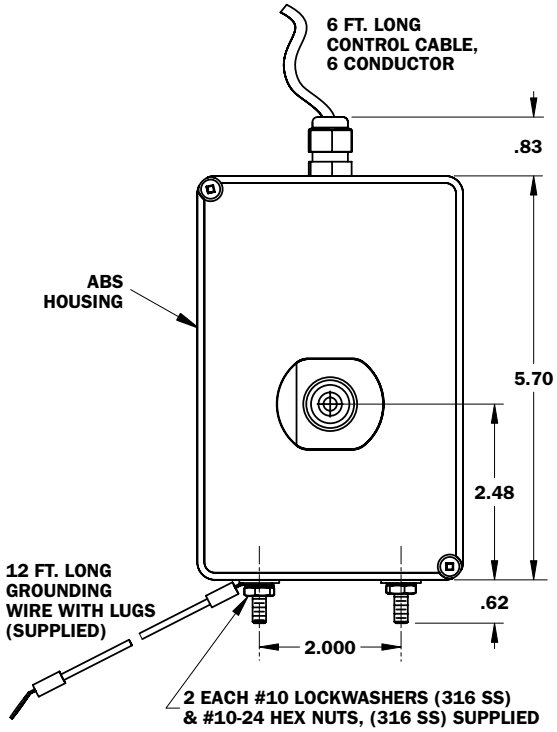
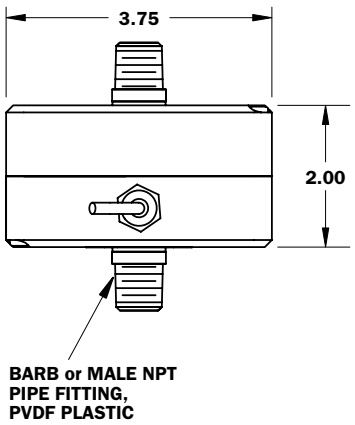
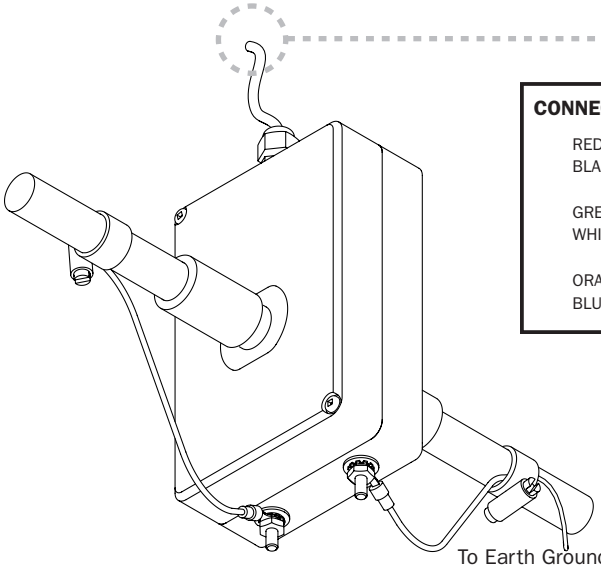


Table 1: Fittings and Length		
Size	**Fittings**	**L (Length)**
-025	1/4" Barb, 3/8" NPT	3.75
-038	3/8" Barb, 3/8" NPT	3.75
-050	1/2" Barb, 1/2" NPT	4.90



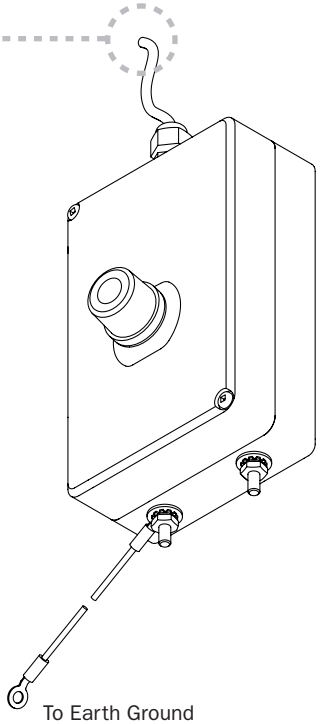
IDEAL GROUNDING WITH METALLIC PIPING



CONNECTIONS

RED	+ 12 to 24 Vdc Power
BLACK	- Power
GREEN	+ Pulse Output Isolated
WHITE	- Pulse Output Isolated
ORANGE	+ 4-20 mA Isolated
BLUE	- 4-20 mA Isolated

STANDARD GROUNDING



TROUBLESHOOTING

Problem	Probable Causes	Try...
Analog output at 0 mA	No loop power	4-20 mA loop needs an external power supply - if missing, add it
Analog output is 4 mA with flow	Unit not grounded	Connect to earth ground
	Flow reversed	Note flow direction arrow, reverse direction to match
No pulse output	Reversed output connections	Change output connection
	Not grounded	Connect to earth ground
	Reversed flow	Change flow direction
Flow rate incorrect	Missing or incorrect ground wire	Check for proper grounding
	Fluid conductivity <20 microSiemens/cm	Select another flow meter
	Empty pipe	Install meter in vertical position

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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